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Effectiveness of Kumospace Apps on the Academic Performance of Grade 9 Students in Online Physics Class

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ABSTRACT

Kumospace is platform that provides an immersive and fun experience online, designed to recreate physical experience and atmosphere of being in a room, you can move around and connect with others virtually with the simplicity of a video chat and the creativity of video games. This study aimed to determine the effectiveness of Kumospace on the academic performance of Grade 9 students in online Physics class. This research is limited only to two sections in Grade 9, Academic Year 2021-2022. It used the quantitative research design with 30 participants for the control group and 30 participants for experimental group. Pretest and posttest were taken thru google form attached to the learning management system, which were prepared with a TOS ahead and validated by the experts before it was conducted to test. Results showed a high mean score of 3.333, 3.442, and 3.383 respectively, in terms of content quality, learners need and website quality which means that the students strongly agree and are satisfied with the features of Kumospace, while mean scores of the posttest for both sections gave an excellent result. The finding of the study showed that t-test analysis on the effectiveness of Kumospace on the academic performance of Grade 9 online Physics class resulted a p-value of 0.401 which means that they are not significant. Therefore, with consideration of the results, disregarding the H1, it can be concluded that Kumospace is an effective intervention to improve the academic performance of learners in the conduct of online physics classes but cannot be significantly compared to other online applications, specifically Zoom.

INTRODUCTION

Kumospace, is a virtual assembly space that works more like a party than a prison. It is a better way to make virtual learning fun for both student and teacher. With Kumospace, you can infiltrate the world of a virtual classroom, with places to sit, opportunities to break into diverse corners for group assignments, and easy interaction with your classmates. You can also customize your virtual background and add your chosen music playlist or YouTube videos. The video chat platform has been used by a number of K-12 schools as well as for interactive courses or events for Harvard University, Columbia University Business School, and Tufts University, among other institutions (Krecher, 2021).

The advent of online education has made it possible for students with busy lives and limited flexibility to obtain a quality education (Paul, 2019). COVID-19 has disrupted most of the industries in the world and education is the only industry that has completely transferred to online mode in most countries around the world. (Mahyoo, 2020).

This shift in the pedagogical medium is forcing academic institutions to rethink of how they want to deliver their course content that can ensure better academic performance of learners. With technological advancement, learners now want quality programs that can access from anywhere and anytime (Paul, 2019).

Lockdowns imposed by the government have destroyed

once-vibrant learning settings, pushing education providers to quickly implement online learning tools to support remote student involvement. Due to this, innovative learning and communication platforms have been deployed, radically altering the landscape of teaching and learning for disciplines and institutions that previously assumed that learning took place in a physical setting. In these situations, the difficulty frequently stems from a need on the part of the institution to recreate physical classrooms virtually using already-existing distance education infrastructure (Arasaratnam-Smith & Northcote, 2017).

The public health emergency brought about by Covid-19 calls for the Department of Education (DepEd) to be innovative and resourceful in delivering quality, accessible, relevant, and liberating education. In response to this emergency, DepEd develop the Basic Education Learning Continuity Plan (BE-LCP) to ensure that learning opportunities are provided to our learners in a safe manner, through different learning delivery (DO 18, s. 2020).

Moreover, this is also in accordance to the Department of Education's goal on the modernization of its operations to the teaching and learning process which is the DepEd Computerization Program (DCP) (DO 95, s.2010). Education in digital age has been focused on social and human interactions. Teachers, students, university administrators, parents, community members have been

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connected to know, learn, and share their everyday activities. Modern Information and Communication Technology (ICT) are extensively explored and utilized for their potential contribution to make education that can meet the expectations of the society in terms of enhancing students' skills that future employers need.

Communication tools have been intentionally and unintentionally used by teachers and students for academic use purposes. The rising of connectivity allowed users to generate, share, and develop the content by using wide variety of technologies like YouTube, messaging and chat, RSS feeds, Podcasts, blogs, online grading, quiz and assessment tools, publishing and social networking sites. Social Networking Sites (SNS) like Facebook are commonly used to connect to other people online for social and academic purposes. The technological challenges that students may face in online learning environments depend on a variety of variables, including the standard of the communications infrastructure and the accessibility to software and hardware platforms that support learning. Satisfactory internet connectivity was one of the most fundamental barriers to switching to online learning that was noted in the studies (Chan & Wilson, 2020; Lassoued *et al*, 2020).

The teaching methods and administrative assistance necessary to maintain meaningful student involvement are at the heart of worries about moving face-to-face education to online delivery (Wingo *et al*, 2017). Such factors frequently have their origins in the discipline being taught and the traits of the intended students. For instance, a training program in advanced statistical techniques would require completely different teaching approaches and learning tools than medical and other health-related courses with a practical component. What was once very simple to do in a face-to-face setting, such as practical demonstrations, becomes quite difficult in an online setting and necessitates subject matter experts becoming proficient in the use of quickly evolving learning technologies that are not typically used to teach hands-on activities in their field (Mitchell, 2020).

Asynchronous and synchronous are the two main categories into which information technology (IT) tools and other infrastructure used to support higher education can be divided (Larasati & Santoso, 2017; Lim, 2017). According to Larasati and Santoso (2017), asynchronous learning systems are constructed on communication platforms that do not call for time-sensitive interactions between participants in the educational process. According to Pilli (2014), Subramanian *et al* (2014), and Turnbull *et al* (2021), LMSs have traditionally played a crucial role in allowing access to online learning environments and coordinating assessments. LMSs are primarily made to work asynchronously, yet many students have only ever used them as a tool to support mixed learning in a classroom setting (Ngom *et al*, 2012). In studies that looked at the use of online technologies in certain courses and programs, Moodle was the primary platform for performing asynchronous learning activities

(Davies *et al*, 2020).

Learning Management Systems (LMSs), such as Moodle and Blackboard, are examples of well-known remote learning platforms that are designed to promote stakeholder interactions based on a "request-response" paradigm free from time constraints. As opposed to asynchronous online learning, which involves the real-time exchange of information, synchronous online learning is typically carried out through video conferencing systems like Zoom and Skype (Janghorban *et al*, 2014; Kohnke & Moorhouse, 2020). From about 1996 onwards, regular classroom teachers started to incorporate the internet into their teaching. Online discussion forums are used to continue discussion after class or the lecture. Various software platforms such as WebCT and Blackboard were also developed (Bates, 2008).

At present, Zoom, Google Meet, and Microsoft Teams are commonly used in video conferencing specially in the conduct of online classes. To level up the online class discussions and cater the increasing demands and changing interests of the modern-world students, teachers must constantly innovate and look for technologies that encourage active interaction within the class while putting into consideration all the most essential learning competencies, our students are expected to learn.

Both faculty and students must possess pedagogical and technical expertise to successfully teach and learn online. In their study on hurdles to online learning, Lassoued *et al* (2020) note that student adjustment issues and faculty proficiency in online assessment are the two main roadblocks to a smooth transition to e-learning. According to a study on the digital competence of faculty and students at a Spanish university, this disadvantage in grasping online teaching and learning styles is exacerbated by a lack of faculty and student fluency in the use of online technology. According to Mouchantaf (2020), this apparent digital literacy gap may be caused by a lack of institutional support.

Administrators should not only support teachers in keeping up their knowledge of contemporary e-learning tools, but also give them opportunity to gain expertise in best practices in curriculum development and instruction (Schmidt *et al*, 2016). Thus, this research investigated whether the academic performance of the Grade 9 students in their online Physics class has improved when introduced with an immersive video chat platform that features interactive activities, known as Kumospace.

METHODOLOGY

Research Design

This study used quantitative design specifically the experimental research method in order to gather the data. The experimental research method was used to measure the control group and test group improve in academic performance towards Physics using Kumospace in online class through the pre-test and post-test scores. Furthermore, this study also used to show the effects of Kumospace in the academic performance of learners as

well as the effectiveness of this application Kumospace in terms of its content quality, learners needs and website quality.

Sampling Design

This study adopted stratified sampling design. The researchers got 60 students from the whole population of Grade 9 students as the participants of the study. After determining the number of students-participants of Grade 9 level, half of the population used Kumospace while the other used Zoom in the conduct of online classes. Pretest and posttest were given to all two sections.

Sample Treatment

The researcher crafted a questionnaire and was submitted to the adviser for content validation for the improvement of the instruments. The data collection of this research was thru Google form. A survey questionnaire was adapted as the instrument in gathering the data for the effectiveness of the application, Kumospace. The participants were asked to answer the questionnaire which consists of two parts. The first part asked for the profile of the participants while the second part includes the assessment of the students in using Kumospace in terms of website quality, content quality, and learners' needs.

Data Gathering Procedure

After the validation of the instrument, the researchers secured a permit to the administrator of said school. After given the permission, the researchers explained the purpose of the study to the participants and they made sure each participant corresponded to their predefined criteria. A 25-item pretest was given to all 60 participants before the conduct of physics classes, thru google form attached the learning management system. After the discussion of the lessons the control group then answered the 25-item posttest while the experimental group answered both the posttest and the survey questionnaire. The questionnaire was sent thru google form that comprised their age, gender and year level and included the questions about the perceptions of learners in the use of Kumospace in terms of content quality, learner's needs, and website quality. The results were then checked, interpreted, and analyzed using JASP, a statistical tool.

Data Treatment

The data gathered was classified, analyzed, and interpreted using the following appropriate statistical

tool. Frequency Counts and Percentage. This was used to analyze and interpret the demographic profile of the respondents. Weighted Mean. This tool was used to analyze and interpret the effectiveness of Kumospace in online Physics 9 class.

RESULTS AND DISCUSSION

In recent years, many researchers have investigated the effectiveness of digital technology in the promotion of learning (Lin & Chen, 2013). Several factors have been found to correlate with e-learning effectiveness which includes self-efficacy, interface, community, usefulness, students' satisfaction and intention to use e-learning (Al-rahmi *et al*, 2015).

A study by Chuang & Tsai (2014), evaluated and developed five assessment indexes required toward construction of e-learning websites, "Assessment Guidelines on e-Learning Website." These five assessment indexes were "teaching materials and structure," "layout design," "interaction design," and "establishment of system configuration." In this study three aspects; content quality, learners' needs, and website quality were used to determine the effectiveness of Kumospace in the improvement of the academic performance of Grade 9 students in their online Physics class. In the survey given, agreement scale was used to measure the satisfaction of the participants in using Kumospace. Satisfaction is a level factor of expectation and performance. A supportive learning framework can enhance the learner's satisfaction and success with online learning environments. Learner's satisfaction is an essential measure of the educational program quality, besides being considered as a significant element to the completion of course (Abuhassna *et al*, 2020).

After responses has been tallied, mean score of the agreement scale for each aspect; content quality, learner's needs and website quality were determined and presented in Table 4. Mean score was also taken for each sub-aspect as shown in Tables 1,2, and 3 to determine the effectiveness of Kumospace in the improvement of the academic performance of the Grade 9 Physics class. The system of e-learning refers to the tools by which students gain access to content. The task interaction in which individuals are involved is based on contents of e-learning (Al-Rahim, *et al*, 2017).

The quality of content, which is intended to create a specific visually attained perception, as well as developing a successful transmission system with an effective message system, eventually

Table 1: Mean score of the student agreement scale for content quality

Indicators	Mean
Right and understandable content	
2.1.A . The materials used is of high quality, clear, credible and the learner's objective is satisfied.	3.300
2.1.B. Right and understandable content: Language (including vocabulary) is appropriate to the target user level.	3.333
2.2.A Complete content: The materials used are accurate, current, factual, thorough, precise and complete	3.333
2.2.B. Complete content: Content promotes positive values that support formative growth.	3.367

enhances the quality of educational design work. Quality features related to perception and specifically visual perception have to be considered in may design settings, with a particular emphasis in educational settings and design work (Eristi *et al*, 2010).

Under content quality, students strongly agree that the materials used is of high quality, clear, credible and the learner's objective are satisfied and that the language used is appropriate to the target user level. The indicator 2.1.A got a mean of 3.300 which translates that the respondents strongly agree that the materials used in Kumospace are of high quality. Indicator 2.1.B, on the other hand, got a mean of 3.333 which means that the respondents strongly agree to the appropriateness of the language used in Kumospace.

In a related study about user satisfaction towards learning management system, in the result of the study with the estimated weight regression of 17.5%, it could be concluded that System content positively affect LMS usefulness that leads to the influence in students' satisfaction (Nguyen, 2021).

The indicators 2.2.A and 2.2.B got a mean of 3.333

and 3.367 respectively. This translates to the fact that the respondents strongly agree to the accuracy of the materials used and that the content support formative growth. In distance learning, it is an important thing to note that students' concentration during online classes affects their performance. Since Kumospace is a combination of the common features of a video game and a video conferencing tool, this can help mitigate the concentration problems of students during online class via any web conferencing tool. The 52% indicated that very seldom has concentration problems during classes, only 32% who has problems often, and the 16% indicates constantly has problems (Rio-Chillcce *et al*, 2021). The 24% rated that their performance has improved considerably, the 60% considers that his performance has remained on the sidelines, and only the 16% indicates that its performance has decreased (Rio-Chillcce *et al*, 2021). The result of this study on the content quality of Kumospace may help the 60 % of the respondents who considered that their performance has remained on the sidelines while using videoconferencing tool in their online classes.

Table 2: Mean score of the student agreement scale for learner's needs

Indicators	Mean
3.1.A. Variety of educational level: The site can be used by different levels of education (can be used by higher education)	3.333
3.1.B. Variety of educational level: The site can be accessible without any restriction.	3.533
3.2.A. Personalization: The level of individualization from users' requirements is satisfactory.	3.533
3.2.B. Personalization: Knowledge construction should result from the experiential world of the users.	3.367

Indicator 3.1.A got a mean of 3.333 which mean that the respondents strongly agree that Kumospace can be used in different levels of education. Indicators 3.1.B and 3.2.A on the other hand both got a mean of 3.533 which translates to the fact that the respondents strongly agree that the site can be accessed without restrictions and that the level of individualization from users' requirements is satisfactory. These are important factors to engage the students in the lesson, encouraging learning and learner's satisfaction. The students were satisfied, and they agreed that web-based courses improve their achievement in relation to students' background, students' experience, students' learning autonomy, and students' dialogue (Abuhassna *et al*, 2020). Results indicate that communication tool used in the distance learning situation connect both time and physical dimensions to close the students and faculty as a virtual group. The implication of technology enormously encourages and improves the communication not only between teachers and students but also among students. Students want to use interactive tools to make their learning easier and more efficient and allow them to learn anywhere and at any time (Abuhassna *et al*, 2020).

Indicator 3.2.B got a mean of 3.367 which means that the respondents strongly agree that in Kumospace, knowledge construction should result from the experiential world of the users. Some of the current features of Kumospace are related to Roblox, an online application which offers

numerous opportunities for education from its front end (the games) or its back end (coding & building). Games such as Work at a Pizza Place, Farmtown, Theme Park Tycoon, Jailbreak, and Murder Mystery 2 are numerous examples that can be utilized objectively. These games are designed to accomplish tasks and allowing students to role-play, create a virtual world, and customize different things (Long, 2019).

In Kumospace, a teacher can rearrange any part of the floors to recreate a real-world scenario which can be used to discuss specific subject matter. Students then can answer questions, play games, create concept maps, or draw and label parts of a structure depending on the topic. This enhances the problem-solving abilities and psychomotor skills of the learners. Samuel Reed III is a self-described early tech adopter who before Covid-19 hit had already been experimenting with education technology in his role as a humanities teacher at U School, a Philadelphia public high school. He uses Kumospace, an immersive video chat platform that has vivid, video game-like settings that mimic the real-world regularly as a remote learning tool. Results show that integrating different interface can result in different learning pattern with respect to factual learning and skill involved problem solving which considered as high order learning. Interface such as pop-up window and web framed-base are able to improve student learning rate that have little experience

in e-learning than with browser scroll interface. With a proper design of modules in e-learning this will encourage in problem solving skills (Al-rahmi *et al*, 2015)

The construction of the interface will greatly on how the user sees and fully grasp of the system functionality that it will be part of the system that promotes user to interact with basic technologies, thus this will bring impact on the functionality (Al-rahmi *et al*, 2015).

Major determinant that influences perceived usefulness greatly are e-learning design. When the students gain fulfillment in using online courses, they are confident on the perceived usefulness. The user's perception on ease of use is of importance to understand users' satisfaction. If the task given can be accomplished with less effort, the system is user-friendly. By making the e-learning system easy for all level of user to use, it will make them more attracted towards learning the content rather than wasting time on learning the tools (Al-rahmi *et al*, 2017).

Table 3: Mean score of the student agreement scale for website quality

Indicators	Mean
4.1. Design	3.233
4.2. Navigation	3.600
4.3. User-friendliness	3.366
4.4. Interactivity	3.333

In Table 3, students agree that the appearance or the design of the site generated positive impression to the user's sight. For the navigation, respondents strongly agree that the directions for accessing the relevant information to the user is satisfactory. Mean scores showed that for the user-friendliness and interactivity, the respondents strongly agree that Kumospace gives the user ease of understanding needed to use the site correctly and that the level of involvement of the learners is very satisfactory. The results show that the students exhibited consistently positive responses for all aspects similarly shown in Liu *et al* (2013). Quick access to information, anywhere and anytime learning, interacting with friends and facilitating learning are observed as important key points of mobile learning according to the interviews with students. Mobile learning applications increase the effect of learning and enhance the process of learning (Huang *et al*, 2014; Wishart, 2015).

Perception oriented design principles received a higher priority in making educational designs. Expectations regarding the design aspect of websites developed for educational purposes soared up with the rapid spread of internet services over the past decade. It is thought that greater attention must be paid to visual design principles while developing website design for educational purposes (Eristi *et al*, 2010).

Website quality, content quality and learner's needs showed very high mean score in the agreement scale which signifies that user of Kumospace application strongly agree that it is very satisfactory in these aspects. This research examined the effectiveness of online

Table 4: Average Mean score of the student agreement scale for website quality, content quality, learner's needs

Indicators	Mean
Content Quality	3.333
Learner's Needs	3.442
Website Quality	3.383

learning applications on Grade 9 students' academic performance, attitudes toward online learning and animation development levels. Online learning using Kumospace has significantly positive effect on academic performance of the learners. Results were similar to those of Oberer and Erkollar (2013) and Hwang and Chang (2011). Similarly, Hwang and Chang (2011) indicate that online learning not only catches students' interaction but also increases their success.

When differentiated assessment techniques exist to evaluate effectiveness of e-learning, student activity may be remedied or enhanced through various criticisms to accomplish better performance. System quality expanded the effectiveness of learning system while content quality made worth and learners' satisfaction. Decent learner-interface can increase the learner's inspiration to learn by providing them with controls, showcases and data components that keep them intrigued (Al-rahmi *et al*, 2015).

Table 5: Pre-test and Post-test of Grade 9 Science section Integrity (Control) and section Faith (Experimental)

Section	Pre-test Mean	Post-test Mean
Integrity	14.367	17.900
Faith	11.600	17.133

The pretest and posttest results demonstrate that Kumospace significantly increased the scientific knowledge as supported by Lin *et al*. (2013). Table 5 shows the mean score of the sections (Integrity and Faith) in pretest and posttest. Section Integrity got highest mean score in pretest with 14.367 while the section Faith got 11.600. The result indicates that section Integrity is a special class where most of top performing students belong while section Faith is categorized as a regular class. The result of post-test showed that the two section has almost the same posttest score with a mean of 17.900 and 17.133, both sections have big improvement in their academic performance with and without intervention. According to Learning Links Academy (LLA) 2020 that many e-learning resources have been included by the DepEd in the Philippines to aid students in their online classes. The range of available digital tools has been proved to enhance the learning process. Learning has become more accessible because to websites like Open Educational Resources (OER). Students now have access to a wide range of resources to aid their study rather than being restricted to textbooks. Additionally, the subjects that the learner can learn on these websites are not constrained. There are far more subjects accessible than

were actually taught in schools (Berame & Baring, 2022). Their academic performance will undoubtedly improve as a result of the increased information base.

Ersoy et al. (2019), showed that there are substantial differences between the results of the pre- and post-tests for the achievement test, the efficiency of acquiring Google Applications ability to perceive space. It proves that any tool of e- learning can be used for the better improvement in the academic performance of the students.

The table above shows the result of the Paired Sample T-Test of the post-test results of the two sections of Grade

9, the control group (Integrity) and experimental group (Faith). It can be gleaned from the table above that the p-value is 0.401, thus, hypothesis 1 is rejected. This shows that there is no significant difference in the improvement of the Grade 9 students using Kumospace from students not using Kumospace in terms of their academic performance. This means that both sections got almost the same score in post-test. The use of Kumospace and zoom are effective in the improvement of the academic performance of the learners but in terms of results it has no significant difference in the effectiveness compared to other applications, specifically Zoom.

Table 6: Paired samples t-test analysis on the effectiveness of Kumospace on the academic performance of Grade 9 Physics Class

Measure	t	df	p	Decision	Interpretation AS
Score Post-Test Integrity Score Post-Test Faith	0.853	29	0.401	Fail to Reject Null Hypothesis	Not Significant

Just like the finest illustration of Google Apps that can increase pupils' love of learning child's wellbeing and academic performance, Kumospace can also be used to improve performance of learners. Education Department never stops through offering free accounts, educational resources, presenting many platforms to assist and continue the process of teaching and learning. In all digitization of education will be advantageous to everyone (Lalap, 2021).

CONCLUSION

Results from the survey showed that Kumospace is extremely effective in terms of content quality, learner's needs and website quality. It was emphasized that from the participants responses, the most essential features and characteristics required for a quality instructions website were concluded as the assessment guidelines of an instructional website (Chuang & Tsai, 2014). From the literature gathered, for website quality, design and user-friendliness is very much important, which results showed very good result. Analysis also revealed a significant result for content quality and learner's needs. Based on the gained scores from the pre-test and post-test, there was a big improvement in the academic performance of the learners. On the other hand, the analysis of data showed that there is no significant difference in the academic performance of the learners using Kumospace from learners using Zoom. Overall, students displayed positive attitudes toward the use of Kumospace. Therefore, the researchers conclude that Kumospace is an effective intervention to improve the academic performance of learners in the conduct of online physics class but cannot be significantly compared to other online application, specifically Zoom.

RECOMMENDATIONS

After careful and thorough analysis of the results, the researchers would like recommend the following:

- In terms of the quality of Kumospace, future researchers

can use other aspects in measuring the perceptions of the Kumospace users aside from website quality, content quality, and learner's needs. Other features of the application can also be explored to effectively conduct the online classes.

- The web/app developer will revisit the accessibility feature of Kumospace to allow participants to enter the space through smart phones and tablets. Virtual backgrounds and avatars of the participants is also a great feature to be added.
- For the interest of time, allow students to have a concrete and more valid experience on the said educational web tool and introduce the use of Kumospace in other subject areas like English and Mathematic Subjects.

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